Development of Microbial Biofertilizer for Tomato (*Solanum Lycopersicum*)

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Extensive application of chemical fertilizers and agrochemicals has led to environmental and health issues, and has contributed to climatic changes. In order to minimize the usage of them, environmental friendly biofertilizers containing inoculants of beneficial microorganisms have been introduced. Present study aims in investigating a microbial biofertilizer for tomato, a vegetable highly dependent on the chemical fertilizers (CFs). Bacterial species living in tomato rhizosphere were isolated in Nutrient Agar medium. Growth medium pH, growth in N free Combined Carbon Medium (CCM), phosphate solubilization, indole acetic acid (IAA) production and lettuce seed germination assay were conducted for them and 8 isolates (J, C, S, F, I, R, B, E) were selected for tomato plant assay. Those isolates were inoculated to soil in tomato planted pots in triplicate. Recommended dosage of CFs for tomato was taken as positive control and a negative control was maintained without adding CFs or microbes. Plant height, number of leaves and flowering were recorded at 10^{th} week and data were analyzed by ANOVA in minitab16.1. The highest clear zone diameter (40 mm) in phosphate solubilization and highest absorbance in IAA were given by isolate C. Inoculants B, R, S changed the colour of CCM into blue, while J, E, I, F, C changed the colour of medium to yellow. In lettuce seed germination assay, the highest vigor and germination percentage were observed in B (246) and F (82%), respectively. All bacterial isolates significantly ($p \leq 0.05$) improved plant height over the controls. The highest mean plant heights were observed under bacterial strains C (93 cm), S (91 cm), F (91 cm) and E (90 cm). Plant treated with C showed the significantly increased leaf number per plant over the other species and the controls. Flower number was highest in E and F treated plants. In conclusion, bacterial strains associated with tomato rhizosphere have the potential to be used as biofertilizers to improve the vegetative growth of tomato.

Keywords: Bacterial isolates, Biofertilizer, Tomato